

THE TURKISH AND CAUCASIAN COLLECTIONS OF  
C. KOCH I: TURKEY

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**ABSTRACT.** An elaboration is given of the itineraries and collections of C. Koch in eastern Anatolia in 1837 and 1843. Although Koch made large collections of plants and described numerous new species and varieties (listed in an appendix), relatively few of his specimens are extant. A search for type specimens revealed that although most of his main collection was destroyed in Berlin in 1943, limited numbers of specimens survive there (B) and elsewhere (G, GOET, LE, MEL, MO, P, W).

## INTRODUCTION

In the course of extracting records from the literature for forthcoming volumes of the *Flora of Turkey*, considerable difficulty was experienced in dealing with those attributable to C. Koch, who collected in E Anatolia and the Caucasus between 1836 and 1844. The main source of records was Koch's 'Beiträge zu einer Flora des Orients', published in a series of parts in *Linnaea* from 1848 to 1851 but incomplete; major families not treated included Cruciferae, Ranunculaceae, Rosaceae and Umbelliferae. This work had not previously been scanned for records, although many were obtained indirectly through having been cited in Tchihatcheff's *Asie Mineure-Botanique* (1860) and in Boissier's *Flora Orientalis* (1867–1884).

This paper deals with Koch's travels in Turkey; a subsequent one will cover his Balkan and Caucasian travels.

It soon became clear that many of Koch's collecting localities were obscure, vague and almost impossible to localise. Reference to the original gatherings was largely precluded, as most of the specimens, including the holotypes, were destroyed in a bombing raid on Berlin in 1943. By a fortunate coincidence, however, Professor G. Wagenitz had discovered bundles of unmounted duplicates from the Koch herbarium in the Berlin herbarium (B); some of these plants had been collected by Koch on his Oriental expeditions, though a much larger number were from his private herbarium which included specimens from various other collectors from several parts of the world. One of us sorted through this collection, extracted Koch's Oriental gatherings, and searched Hb. B for types while the other organised a search of other herbaria for extant types and other Koch specimens.

It is clear that only a very small proportion of Koch's specimens from E Anatolia and the Caucasus has survived as duplicates, though a somewhat larger number of specimens collected by Koch's contemporary, Thirke, have been located (at G, GOET, LE, MEL and MO).

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The problem of Koch's itinerary is less perplexing, thanks to the series of travel books which he wrote after each of his expeditions. Extracts of these were compiled (by H.W.L.), including names of new taxa described by Koch as well as a complete list of all the towns, villages, and other geographical features. It is clear that Koch made two important collections within the territory of present-day Turkey, Kars province, during his *first* expedition: on 8th May 1837, at Ani, a historical Armenian site on the west bank of the Arpa Çay, and from 29th May until early June of that year around Kulp (now Tuzluca) in the Aras valley (see fig. 1). In addition, Koch collected in the Balkans and S Russia on his second trip; a few new taxa were based on this material.

Koch's second expedition is of greater importance to students of the flora of Turkey than the first, and is in some ways less problematical, since in his first papers on the flora of 'Caucasia and Armenia' (Koch, 1841-1843) only the vaguest indication of provenance is given. This was partially remedied in the 'Beiträge' (1848-1851), where somewhat fuller details are provided. A list of the regional names used by Koch in both papers was therefore compiled (by J.R.E.) so that we could get a better idea of the extent of the areas to which the terms applied. In most cases, of course, they bear only a flimsy resemblance to present-day administrative boundaries. The terms 'Armenia' and 'Lazistan' are distinctly out of favour in Turkey; the Armenian S.S.R. and Koch's 'Armenia', the Georgian S.S.R. and Koch's 'Georgia', the South Ossetian autonomous Oblast and Koch's 'Ossetia' are by no means equivalent. The problem is best overcome by consulting a map of the period. For Turkey and adjacent Transcaucasia, Kiepert (1844) proved very useful, but the primary source of information was the series of maps published by Koch himself (see 'Maps' below). The position of the border between Turkey and the Caucasian provinces of Russia during the period of Koch's expeditions is illustrated by Allen & Muratoff (1953), map 1; this work is also a useful source of information on the historical geography of the whole area.

Though Koch was responsible for publishing over 550 new species and many new varieties (see appendix), relatively few of his species remain accepted at that rank and many have been relegated to synonymy. This is not solely due to the use of an over-narrow species concept; Boissier's *Diagnoses* are equally open to criticism in this respect. Unlike Boissier, whose *Flora Orientalis* permitted a complete revision of his earlier work, Koch never returned to his Oriental studies in later life, except for a few incidental references in his dendrological work. The fate which befell many of Koch's new taxa is attributable at least in part to his neglect (or ignorance) of much contemporary literature. Koch's 'Beiträge' were predated (Stafleu, 1967) by many of the relevant parts of Boissier's *Diagnoses*, and several other important works were currently in progress [e.g. Jaubert & Spach's *Illustrationes* (1842-) and Ledebour's *Flora Rossica* (1841-)]. The brevity of Koch's original descriptions may well have been a contributory factor. Nevertheless, in the course of preparation of the *Flora of Turkey* a number of cases came to light in which Koch's names, treated as doubtful synonyms in the absence of available type specimens and of precise details of their sites of origin, may be the earliest validly published ones for certain taxa. The importance of any surviving types is therefore considerable.

As an aid to the recognition of Koch's types, a list of his new taxa published

in *Linnaea* vols. 15-24 (1841-1851) is given as an appendix to this paper. Although this list was circulated to various herbaria believed to hold Koch material, and a note published in *Taxon* (Edmondson, 1976) appealing for information, only two replies were received (from GOET and MO).

We are grateful to the following herbarium directors and staff for their help in locating type specimens: Professor G. Wagenitz (GOET); the late Professor B. K. Shishkin (LE), who helped Dr P. H. Davis to find and photograph a number of Thirke types during his visit to Leningrad in 1956; Professor M. R. Crosby and Mr D. Lorence (MO), who arranged a search of the Bernhardi Herbarium. Thanks are also due to Ann Delaney and Dr F. Timmler for helping to prepare the index of localities and the list of taxa described by Koch, and to Gillian Meadows who drew the maps. J.R.E. is indebted to the Science Research Council (United Kingdom), whose financial support for the Flora of Turkey project enabled his share of the work to be accomplished. Prof. Stafleu kindly provided us with the publication dates of the reprints of Koch's *Beiträge*.

#### TRAVELS

Karl Heinrich Emil Koch (conventionally abbreviated nowadays to C., or Carolus, Koch to distinguish him from other botanists of the same surname) was born in 1809 near Weimar and studied at Jena and Würzburg. An early wishful dream of his seems to have been to see the legendary Caucasus and climb Mount Ararat (C. Koch, 1842); however, the project had to wait until 1836, when after his father's death he had the necessary financial means (Th. Koch, 1879; Balfour, 1883).

Koch had a very broad range of interests including zoology, geology and geography (see 'Maps' below) as well as anthropology, ethnography, archaeology and history. All these aspects of his journeyings are dealt with in detail in his well written, comprehensive and voluminous books of travels (C. Koch, 1842-43, 1846b-47, 1851a, 1854).

However, Koch's main interest was botany, in particular horticulture, dendrology and the ancestral forms of cultivated plants (mainly fruit trees) which were believed to have originated in the Caucasian region. Koch's books of travels contain a considerable amount of botanical information (especially C. Koch, 1842-43), including descriptions of the vegetation, the cultivated plants and localities of new taxa, but omitting descriptions of new species and genera.

On 5th May 1836, Koch, 26 years old and just appointed Professor at the University of Jena, started his first journey. The initial destination was Berlin, where he met Alexander von Humboldt, the famous patron of natural science research, Dubois de Montpérieux, who had recently come back from the Caucasus, and Count Pappenheim. Koch's second objective was St. Petersburg, where he encountered von Fischer, C. A. Meyer and other botanists of the Imperial Botanic Garden, and studied Bieberstein's *Flora Taurico-Caucasica* Herbarium. He had been able to obtain letters of reference from Grand Duchess Maria Pavlovna, sister of Czar Nikolas I, who lived in Weimar and took a great interest in Koch's plans. These letters opened his way to the highest Russian authorities. He was received by Vice Chancellor Count Nesselrode, Minister of Education von Uvoroff, Minister of Finance Count Kankrin and the Vice-President of the Academy, Prince Dondukoff-

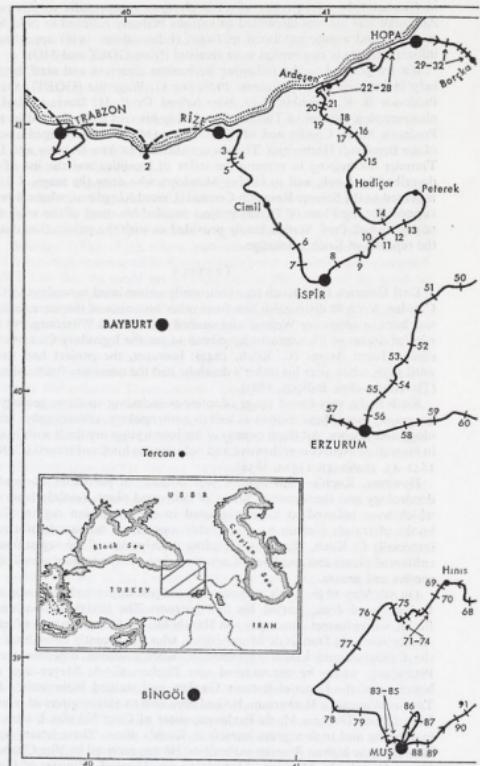


FIG. 1. The itineraries of C. Koch in E. Turkey; the numbers



on the map are cited after the localities listed in the gazetteer.

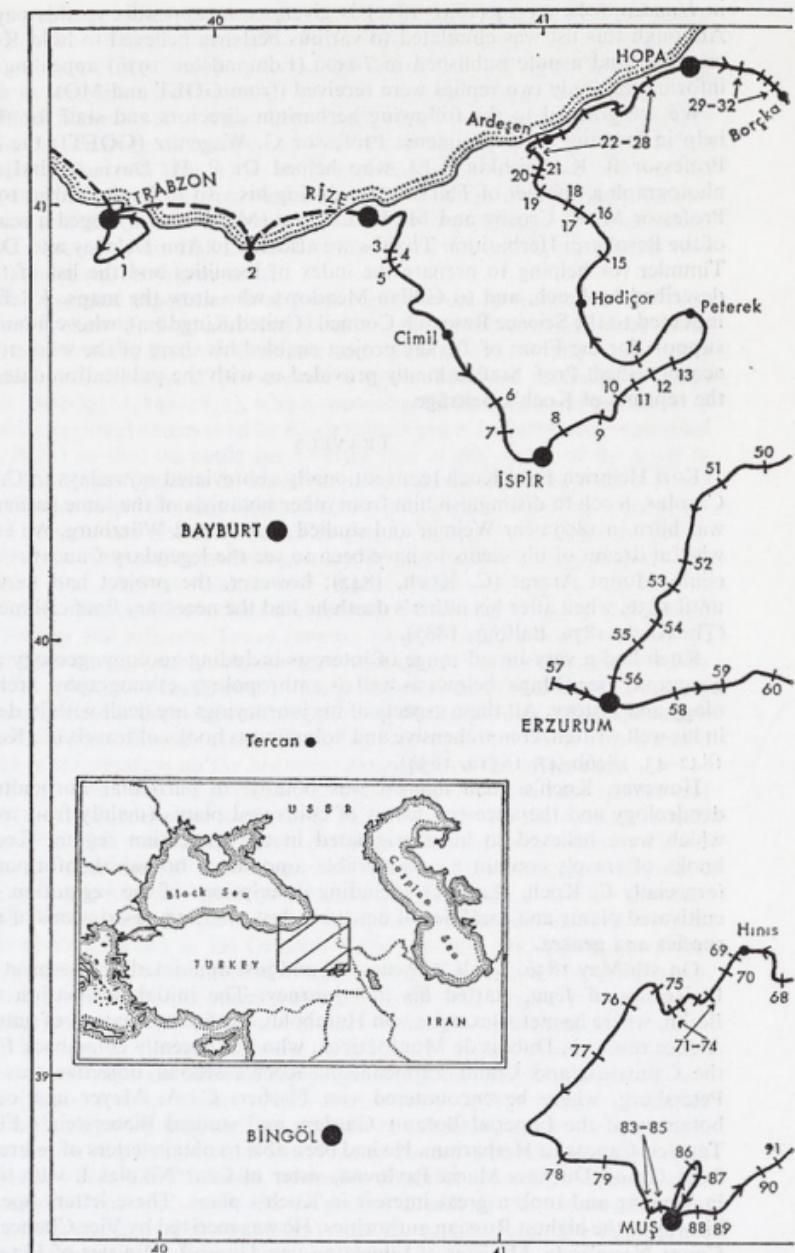
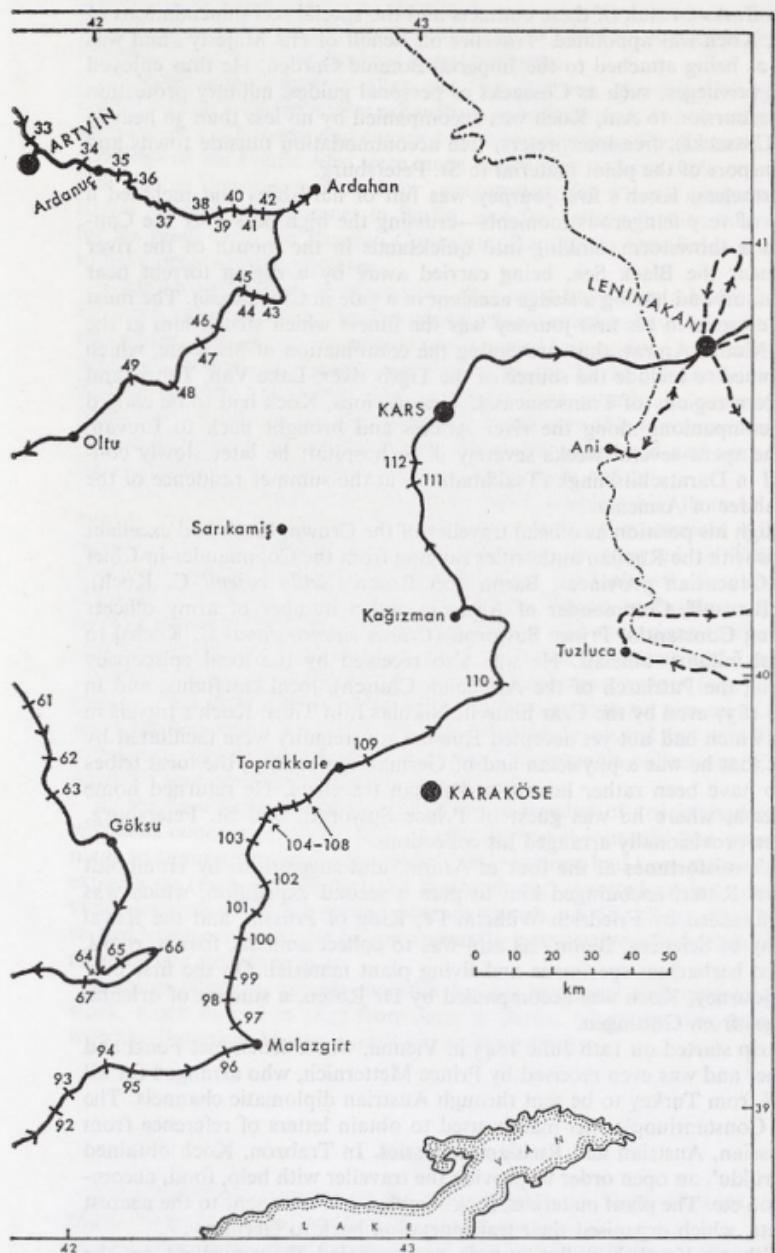


FIG. 1. The itineraries of C. Koch in E Turkey; the numbers



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Korsakoff. As a result of these contacts and the special recommendations of Fischer, Koch was appointed 'Traveller on Behalf of His Majesty', and was treated as being attached to the Imperial Botanic Garden. He thus enjoyed unusual privileges, such as Cossacks as personal guides, military protection (on his excursion to Ani, Koch was accompanied by no less than 36 heavily armed Cossacks), free interpreters, free accommodation outside towns and free transport of the plant material to St. Petersburg.

Nevertheless, Koch's first journey was full of hardships and included a number of very dangerous moments—crossing the high pass over the Caucasus in a snowstorm, sinking into quicksands in the mouth of the river Lypsa near the Black Sea, being carried away by a raging torrent near Chokhatauri and having a sledge accident in a gale in Ciscaucasia. The most critical episode in his first journey was the illness which struck him at the foot of Mount Ararat, thus preventing the continuation of his route, which was planned to include the source of the Tigris river, Lake Van, Tabriz and the eastern regions of Transcaucasia. Unconscious, Koch had to be carried by his companions along the river Araxes and brought back to Erevan, where he spent several weeks severely ill in hospital; he later slowly convalesced in Daratschitschagk (Tsakhtadzor), at the summer residence of the Commander of Armenia.

Through his position as official traveller of the Crown, Koch had excellent relations with the Russian authorities ranging from the Commander-in-Chief of the Caucasian provinces, Baron von Rosen (*Scilla rosenii* C. Koch), Prince Betusoff, Commander of Armenia and a number of army officers [including Constantin, Prince Suworoff (*Crocus suworowianus* C. Koch)] to the local military officials. He was also received by the local episcopacy (including the Patriarch of the Armenian Church), local chieftains, and in autumn 1837 even by the Czar himself, Nikolas I, in Tiflis. Koch's travels in regions which had not yet accepted Russian sovereignty were facilitated by the fact that he was a physician and of German nationality; the local tribes seem to have been rather hostile to Russian travellers. He returned home via Odessa, where he was guest of Prince Suworoff, and St. Petersburg, where he provisionally arranged his collections.

Koch's misfortunes at the foot of Ararat, and suggestions by Humboldt and Karl Ritter, encouraged him to plan a second expedition, which was jointly financed by Friedrich Wilhelm IV, King of Prussia, and the Royal Academy of Sciences, Berlin. Its aim was to collect animals, fossils, rocks, minerals, herbarium specimens and living plant material. On the first part of this journey, Koch was accompanied by Dr Rosen, a student of oriental languages from Göttingen.

The trip started on 12th June 1843 in Vienna, where Koch met Fenzl and Endlicher and was even received by Prince Metternich, who arranged for all his mail from Turkey to be sent through Austrian diplomatic channels. The stay in Constantinople was mainly used to obtain letters of reference from the Prussian, Austrian and Russian embassies. In Trabzon, Koch obtained a 'Bujuruldu', an open order to provide the traveller with help, food, accommodation etc. The plant materials, rock samples, etc. were sent to the nearest consulate, which organised their transportation back to Germany.

Turkish or Kurdish police guards accompanied the travellers on the greater part of the route, although they offered scarcely any protection against

robbery. In regions where the Bujuruldu was respected, reception was very friendly (e.g. in Artvin and Ardahan). Regular visits were paid to the local bishops, Turkish authorities and local chieftains.

Although less dangerous than the first journey, the trip through NE Anatolia must have been very exhausting, especially since the travellers often avoided the main roads, and engaged in alpine climbing. The first and second crossings of the Pontic Alps were made under very unfavourable conditions. The stay in Erzurum was used for recuperation, for writing a report to the Royal Academy of Sciences in Berlin, and for getting further information for his maps from the Russian Consulate. Reports to Humboldt also seem to have been written regularly.

Their arrival in Kars in November 1843 must have been a black moment for Koch and Rosen; the caravan which was expected to have brought winter equipment, money and documents was reported lost, and the two travellers—penniless, in summer clothes—were taken by the Turkish authorities to the Russian border, where they had to spend three months in quarantine at Alexandrapol. Not surprisingly, both fell ill and were able to resume travelling only in the spring. In the meantime, Humboldt organized and sent a considerable sum of money from the Academy (Beck, 1961).

In Tiflis Koch obtained a 'Kronsporochnie', enabling him to travel freely and at government expense, and to receive military protection. After an excursion to Kirovabad, Baku and Derbend, he returned to Tiflis and made an unsuccessful attempt, accompanied by Kolenati, to climb Mt Kasbek. Koch then headed back through the Taman peninsula and sailed to the Crimea. After a short stay with Rögner and excursions to the parks and gardens on the south coast, he returned home via Odessa and Lemberg.

On both journeys Koch had visited totally unknown regions (e.g. the high peaks of the Pontic Alps, Peterek, the mountain regions around Kola in the Caucasus and many regions never previously visited by non-Russian travellers). Apart from Tournefort's and Wiedemann's collections, Eastern Anatolia was practically unknown botanically.

By the time Koch returned to Germany, a number of articles had already appeared concerning his travels, mostly in 'travel journals' (no attempt is made to summarise them), and considerable interest had been aroused in his expeditions (even the 'Preussische Staatszeitung' reported on his tour). His vivid descriptions of his second journey (Koch, 1846b, 1847, 1851a, 1854) started to appear soon after his return and the botanical results were published more or less simultaneously.

Because of more suitable facilities for his botanical and cartographical work, Koch moved in 1847 from Jena to Berlin, where he was associated with the Botanical Museum until his death in 1879.

#### HERBARIUM

Koch based his accounts on the oriental flora (C. Koch 1841-43, 1846a, 1846c, 1848-51, 1851a) on three groups of specimens:

- his own collections made during his two expeditions (1836-38 and 1843-44);

- b) material received from other collectors: Abich (*Halocharis abichii* C. Koch), Brant (*Ziziphora brantii* C. Koch), Kolenati (*Hedysarum kolenatii* C. Koch), Konradi, Wilhelms & Schmidt (*Achillea wilhelmsii* C. Koch, *Milium schmidtianum* C. Koch), Rögner (*Ornithogalum roegnerianum* C. Koch), Struve, Thirke (*Silene thirkeanum* C. Koch);
- c) oriental collections kept in the Botanical Museum in Berlin: Gundelshheimer (*Lamium gundelshheimeri* C. Koch), Szovits (*Epitrachys szovitsii* C. Koch), Sieber (*Mentha sieberi* C. Koch) and others.

Koch also described a few other new taxa, mainly from central Asia and Siberia; these are not dealt with here.

Koch's own collections and the specimens received from other collectors were regarded as his property, but in 1838 he gave duplicates to the Botanical Museum in St Petersburg (Bongard, 1839) and in 1845 to the Botanical Museum in Berlin (Th. Koch, 1879). Much material was either given or sent on loan to other botanists, who later based new taxa on Koch's names and material [e.g. *Bupleurum brachiatum* C. Koch ex Boiss., Fl. Or. 2:844 (1872), *Hypecoum caucasicum* C. Koch ex Ledeb., Fl. Ross. 1:94 (1841)].

After Koch's death his rich collections were split up and given to the Landwirtschaftliche Hochschule in Berlin and to the Gärtnerlehranstalt in Wildpark near Potsdam. Later the material was reassembled at the Landwirtschaftliche Hochschule, and the complete collection was finally handed over to the Botanical Museum in Berlin in 1913 (Ulbrich, 1917). Ulbrich was given the task of working through Koch's herbarium, which had grown considerably in Koch's later years and contained, among others, collections by Blume, Chamisso, Kotschy, Ledebour, C. A. Meyer, Schultz-Bipontinus and Willkomm, and a large amount of dendrological material (Ulbrich, 1917).

By 1913 the material had suffered considerably from inadequate packing and insect attack; numerous specimens (especially type material from Koch's two major expeditions) were missing or conserved only as fragments; furthermore, the labels had often been mixed up (Ulbrich, 1917) and specimens of different origin had been put together. Ulbrich rearranged the collection and published an important account concerning Koch's herbarium (Ulbrich, 1917); it is possible that afterwards duplicates were given to other herbaria. Later the greater part of the herbarium seems to have been mounted and inserted into the general herbarium in Berlin.

During the last war a considerable part of the general herbarium was destroyed by air raids; but a considerable proportion was saved, consequently a small number of C. Koch's oriental specimens (see Appendix) is still conserved in B. Parts of Koch's herbarium which have survived the war unmounted have been made available in the meantime.

Koch's own collections at Berlin are scarcely or inadequately labelled; the labels generally do not mention the collector and very often can only be identified by Koch's striking handwriting (Burdet, 1976). Three types of labels can be distinguished:

1. field labels—small longish strips of paper containing (at most) date, precise locality and name. During his second trip Koch used, in addition, running Arabic numerals placed in the centre of the slip; this numbering includes, however, material collected by others; the use of running Roman numerals for the second part of the first trip as indicated by Ulbrich (Ulbrich, 1917) could not be confirmed.

2. determination labels—rectangular slips of paper containing (at most) determination, diagnosis and a  $\pm$  abbreviated version of the notes on the field labels.

3. Ulbrich's labels—rectangular, printed labels inserted by Ulbrich during the rearrangement of Koch's herbarium containing (at most) an abbreviated version of the data on field and determination labels.

In many cases the field labels and determination slips have got lost and Ulbrich's labels have not been filled in adequately. Koch did not use the data from the field labels in his accounts; he never cites the running numbers or dates and often gives only vague information on the provenance of a given specimen. Since his handwriting is often very difficult to decipher, particular attention should be paid to the dates and the running numbers, if extant, which can be correlated with the locality information by the aid of the itinerary-gazetteer.

Specimens received by Koch from other collectors generally bear no collector's name. Thirke material has an Arabic number on the top left-hand corner of Koch's determination slip. These Arabic numbers seem to refer to collection sites and match the numbers given by Koch in his accounts. Koch (1846a) states that all Thirke material comes from the Brussa region. A few specimens collected by Thirke lack these numbers; others have been inserted into the collection of the second expedition and have received running numbers.

Specimens received from Rögner, Wilhelms and Schmidt were included in Koch's running numbers from the second trip (Wilhelms and Schmidt's specimens occur between 2101 and 5000, Rögner's are numbered 6375-6850; Ulbrich, 1917). Kolenati's specimens were mostly inserted into the collection from the second expedition (between 5001 and 5400; Ulbrich, 1917), but specimens described later (Koch, 1851a) have their own labels.

Material collected by Abich and Brant could not be found; duplicates collected by Gundelsheimer might be traced in Hb Willdenow (B) and Hb Tournefort (P) (Wagenitz, 1962).

#### MAPS

In 1847 a salary was granted to Koch for a period of two years so that he could prepare maps of the region he had visited (Th. Koch, 1879); the result of his studies is a magnificent map at a scale of 1:1 m covering the whole area of eastern Turkey, Transcaucasia, the Caucasus and parts of Ciscaucasia and NW Persia. It was published in four different versions: political, ethnographic, botanical and geological (C. Koch, 1850).

The maps are based primarily on Russian ordnance maps, on corrections made by later travellers and on Koch's own observations. He had drawn numerous profiles and made barometric measurements during his second trip. The maps are hand-coloured lithographs of a breath-taking quality and offer an extraordinary wealth of geographical information. The gazetteer of Koch's collecting localities is mainly based upon these maps and the itinerary followed week by week.

The botanical edition is of particular interest. It represents a vegetation map, in which ten zones are distinguished and marked in different shades of blue, green and brown. Whereas some of Koch's vegetation zones are clearly

circumscribed (e.g. region of evergreen shrubs, region of halophytes), this is not the case in other instances (e.g. a 'region of spinac' in the Kur valley). Although this vegetation map is naïve in some respects and was certainly based on insufficient information, its importance lies in the fact that it was the first vegetation map of the region.

Koch's maps can be regarded as extremely rare; so far only five sets are known to us. The reason might be, besides the high costs, that only a very limited edition was printed. There are hints that the Prussian General Staff, appreciating their military potential, may not have wished them to be too widely available (Th. Koch, 1879) and could have restricted the edition.

#### GAZETTEER

The following alphabetical list of places in Turkey visited by Koch was extracted (by H.W.L) from Koch's travel books (C. Koch 1842-43, 1846b-1847) and enabled an exact itinerary to be prepared (fig. 1—pages 324-325). Running numbers enable a quick localization on the accompanying map; larger towns and important localities named on the map are capitalized in the list. Modern equivalents of Koch's names are given in brackets; these follow the Gazetteer of the US Board on Geographic Names (1960) for their spelling, and have mostly been traced from the 1:500,000 map series (Harita Genel Müdürlüğü, 1946). Kiepert's 1:1m map (1844) was invaluable in helping to locate villages whose names have radically changed.

In the second column of the list, grid squares and provinces are shown, following the system used in the *Flora of Turkey* but with the names of provinces abbreviated thus:

A	Ağrı	K	Kars	Sa	Samsun
C	Çoruh (Artvin)	M	Muş	T	Trabzon
E	Erzurum	R	Rize		
I	İstanbul	S	Sinop		

The third column indicates the date on which the locality was visited, and in the fourth column collecting numbers from labels of specimens surviving at B have been listed to establish a more exact chronology.

Abu (Abi sufla)—25	A8 R	viii 43
Anbarluk (Ambarlik)—4	A8 R	vii 43
Ani (Anikoyu)	A9 K	8 v 37
Anton (?Karasu)—5	A8 R	vii 43
Archaweh (Arhavi)—28	A8 Ç	viii 43
Archon—81	B8 M	x 43
Ardost—112	A9 K	xi 43
Arintsch (Çırış)—85	B8 M	x 43
Artä—17	A8 Ç/R	viii 43
Artahan (ARDAHAN)	A9 K	1-3 ix 43 1950, 1951
Artanudsch (ARDANUÇ)	A9 Ç	30 viii 43 1816
Artaschin (ARDEŞEN)	A8 R	viii 43
Artwin (ARTVIN)	A8 Ç	24-28 viii 43 1736, 1781, 1801
Asachbasar—80	B8 M	x 43
Atina (Pazar)—22	A8 R	17-19 viii 43

Atschmanuk (Acimanük)—84	B8 M	x 43	
Awelbuhur (Abulbahar)—91	B8 M	x 43	
Awnik (Avnik)—62	B8 E	10 x 43	
Badir (Bedir)—105	B9 A	xi 43	
Baghdsche Köi (Bahçeköy)	A2(E)I	vii 43	
Baiweren (Payveren)—63	B8 E	x 43	
Balchar-Jailassi—46	A9 K	ix 43	
Bar—52	A8 E	ix 43	
Baskan (?Silkan)—77	B8 M	x 43	
Begköi—76	B8 M	x 43	
Böyükdere (Büyükdere)	A2(E)I	vii 43	
Bortschal, Botschcha (BORÇKA)	A8 Ç	viii 43	
Bulep—23	A8 R	viii 43	
Chaschlü (Haçlu)—109	B9 A	xi 43	
Chass-Köi (Hasköy)—39	A9 K	viii/xi 43	
Chauth—36	A9 Ç	viii 43	
Chetwis (?Kutul)—37	A9 Ç	30 viii 43 1871	
Chinis (see Chynys)			
Chodudschor (HADIÇOR)	A8 E	10 viii 43 1475	
Chomschan—73	B8 M	x 43	
Choppa (HOPA)	A8 Ç	22 viii 43	
Chorum—82	B8 M	x 43	
Chotanlu (?Bulanik)—95	B9 M	x 43	
Chynys (HINIS)	B8 E	15 x 43	
Dört-Kilise (Dörtkilise)—45	A9 K	ix 43	
Dschimil (CIMIL)	A8 R	30 vii-1 viii 43 792, 891	
Erserum (ERZURUM)	B8 E	9 ix-7 x 43	
Funduklü—65	B9 E	x 43	
Gargarlük (Aşağı Kargalik)—100	B9 A	x/xi 43	
Gartsch (?Nahizer)—7	A8 E	viii 43	
Godschiboreth—34	A8 Ç	viii 43	
Gökssu (GÖKSU)	B9 E	x 43	
Gudraschen (Kudreşen)—11	A8 E	viii 43	
Gümgüm (Varto)—74	B8 M	x 43	
Hadschi-Buddi—98	B9 M/A	x/xi 43	
Hadschi-Jussuf—99	B9 M/A	x/xi 43	
Hansir (Hanzir)—108	B9 A	xi 43	
Haramük (Harami)—68	B8 E	x 43	
Hassan-Kaleh (Pasinler)—59	B8 E	x 43	
Hassanlü (Hasanpaşaköy)—97	B9 M	x/xi 43	
Hintz (Hins)—55	A8 E	ix 43	
Iiidscha (Ilıca)—57	B8 E	21 ix 43	
Ispir (ISPIR)	A8 E	3-4 viii 43 1171, 1200	
Itt (Id, Narman)—51	A8 E	ix 43	
Jaghan (Yağan)—61	B8 E	x 43	
Jilanlu (?Keçan)—75	B8 M	x 43	
Jondschalü (Yoncali)—94	B9 M	x 43	
Kagysman (KAGIZMAN)	A9 K	xi 43	
Kala (Hala)—18	A8 R	viii 43	
Kandilli	A2(A)I	9 vii 43 394	

Kapisteh (Aşağı Kapisre)—27	A8 Ç	viii 43
Karadschawiran (Karacan)—102	B9 A	2 xi 43
Karaghatsch (Karaağaç)—70	B8 E	x 43
Karaköpri—67	B8 M	x 43
Karatschoban (Karaçoban)—64	B9 E	x 43
Karmenik (Gamirik)—10	A8 E	viii 43
Kars (KARS)	A9 K	xi 43
Kaschkent (Başkent)—72	B8 M	x 43 2069
Kewak (Heveg)—15	A8 Ç	14 viii 43
Khardsor (Kásor)—83	B8 M	x 43
Kinsitamar (Kinzodamal)—38	A9 K	(viii/ix 43
Kira Gossak (Giregösek)—54	A8 E	ix 43
Kisil-Kilisse (Kizilkilise)—53	A8 E	ix 43
Kjaghad-Chaneh (Kağıthane)	A2(E)I	vii 43
Kloster Johannes des Täufers, Ssurp Garabed (Karabey)—78	B8 M	19 x 43
Kolossal (Kolhisar)—69	B8 E	x 43
Konstantinopel (ISTANBUL)	A2(E)I	30 vi—14 vii 43
Köpri-Köi (Çobandede)—60	B8 E	x 43
Kulp (TUZLUCA)	A9 K	v—vi 37
Kurudschuk (Korucuk)—58	B8 E	x 43
Kyrmisy-Tusla (?Aktuzla)—66	B9 M	13 x 43
Lamghro (Lamgo)—21	A8 R	viii 43
Linsen-Schloss—87	B8 M	x 43
Lis (Liz)—92	B9 M	28 x 43
Mardo (Mardo)—107	B9 A	xi 43
Mäto—16	A8 Ç/R	viii 43
Melasgerd (MALAZGIRT)	B9 M	29 x 43
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Mollah-Sadi (Mollazade)—106	B9 A	xi 43
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Nadir-Schach (Nadirşih)—101	B9 A	x/xi 43
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Sijareth (Ziaret)—79	B8 M	x 43
Sindisgo (Sindiskom)—41	A9 K	viii/ix 43
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Sirunkh (Sironk)—90	B8 M	x 43
Skutari (Üsküdar)	A2(A)I	vii 43
Sochkom (Sogkom)—89	B8 M	x 43
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Ssarijari (Sariyer)	A2(E)I	vii 43
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#### APPENDIX

New taxa described from SE Europe and SW Asia by C. Koch\*

The following list was compiled from Koch's various papers in *Linnaea* between 1841 and 1851. It does not include the taxa that Koch incidentally described from other areas, such as C Asia. The taxa are listed in alphabetical order by family, genus and species. The names are given as they were published; orthographic errors are not corrected. No attempt was made to exclude illegitimate names, but *nomina nuda* have been omitted. Following the name of the taxon is given the relevant *Linnaea* volume and page number.

Extant types are indicated by standard herbarium abbreviations. It should however be noted that only the Berlin herbarium has been systematically searched for types; Koch types not listed here may well exist in other herbaria such as G, LE and W.

ARALIACEAE	Rindera corymbulosa 22:648
<i>Hedera</i> helix L.	<i>R. pubescens</i> 22:648
var. <i>colchica</i> 16:365 (B)	
ASCLEPIADACEAE	CAMPANULACEAE
<i>Cynanchum</i> minus 19:27	<i>Campanula</i> <i>albiflora</i> 23:634
<i>Vincetoxicum</i> <i>amplifolium</i> 23:592	<i>C. alpigena</i> 23:638
<i>V.</i> <i>latifolium</i> 23:591 (B)	<i>C. betonicaefolia</i> Sm.
<i>V. thirkeanum</i> 23:591	var. <i>byzantina</i> 23:632
BETULACEAE	var. <i>micrantha</i> 19:29
<i>Alnus</i> <i>nitens</i> 22:334	var. <i>multicaulis</i> 19:28 (LE)
<i>Betula</i> <i>ovata</i> 22:333	<i>C. betulaefolia</i> 23:635
BORAGINACEAE	<i>C. biserrata</i> 19:29
<i>Alkanna</i> <i>cordifolia</i> 22:640	<i>C. caucasica</i> Bieb.
<i>Anchusa</i> <i>angustissima</i> 22:633	var. <i>major</i> 23:637
<i>Annebia</i> <i>longiflora</i> 22:640	<i>C. collina</i> Bieb.
<i>Caccinia</i> <i>rauwolfii</i> 17:303	var. <i>dasycarpa</i> 23:643
<i>Cynoglossum</i> <i>parvifolium</i> 22:645	var. <i>leiocarpa</i> 23:643
<i>Echium</i> <i>linearifolium</i> 22:629	<i>C. cordifolia</i> 19:29
<i>Heliotropium</i> <i>canescens</i> 19:21	<i>C. corymbosa</i> Desf.
<i>H. carduchorum</i> 22:627	var. <i>parviflora</i> 19:28
<i>H. commutatum</i> 22:627	<i>C. glomerata</i> L.
<i>Myosotis</i> <i>densiflora</i> 19:20	var. <i>oblongifolia</i> 23:639
<i>M. pontica</i> 22:642	var. <i>ramosa</i> 17:280
<i>Omphalodes</i> <i>pontica</i> 22:646	<i>C. gundelia</i> 23:634
<i>O. stricta</i> 17:302	<i>C. hemischinica</i> 23:644
<i>Onosma</i> <i>elegans</i> 17:306	<i>C. lactiflora</i> Bieb.
var. <i>gundelsheimeri</i> 17:306	var. <i>glabriuscula</i> 23:643
	<i>C. latifolia</i> L.
	var. <i>fimbriata</i> 19:29 (LE)
	<i>C. pilosa</i> Pall.
	var. <i>pontica</i> 23:638

\*A small number of mostly varietal taxa have not been included in this appendix but will be listed in a subsequent paper together with oriental taxa described by Koch from cultivated material (Anon, 1847).

- C. rapunculoides* L. var. *cordata* 23:641  
 var. *grandiflora* 23:641  
 var. *simplex* 23:641  
*C. sessiliflora* 19:30  
*C. sibirica* L.  
 var. *ampliata* 23:636  
 var. *saxicola* 23:636  
*C. syriaca* 23:639 (G)  
*Jasione montana* L.  
 var. *dentata* 19:30 (LE)  
*Phyteuma amplexicaule* Willd.  
 var. *majus* 23:630 (B)  
 var. *minus* 23:630  
*P. canescens* W. & K.  
 var. *humile* 23:630  
*Prismatocarpus speculum* L'Hér.  
 var. *hirtus* 19:30 (LE)
- CAPRIFOLIACEAE**  
*Lonicera chlamydophora* 24:478
- CARYOPHYLLACEAE**  
*Cerastium umbellatum* 15:708  
*Dianthus canescens* 15:710  
*Holosteum dichotomum* 15:708  
*H. polygamum* 15:708  
*Saponaria inclusa* 15:711  
*Silene arenosa* 15:711  
*S. calyculata* 19:56  
*S. inflata* Sm.  
 var. *armena* 15:712  
*S. lasiantha* 15:712  
*S. thirkeana* 19:56  
*Stellaria stricta* 15:707
- CHENOPodiACEAE**  
*Atriplex laciniata* L.  
 var. *discolor* 22:183  
 var. *hastifolium* 22:183  
 var. *microphyllum* 22:183  
*Beta stricta* 22:180  
*B. trigyna* W. & K.  
 var. *glaberrima* 17:311  
 var. *praealta* 22:180  
*Chenopodium pycnantha* 24:90  
*Chenopodium glaucum* L.  
 var. *strictum* 22:182  
*Halanthium rarifolium* 17:314  
*Halimocnemis hirsuta* 22:192  
*H. kulpiana* 17:313  
*H. malacophylla* (Bieb.) C.A. Mey.  
 var. *stevensi* 22:192  
*H. pycnantha* 22:193  
*Halochlora abichii* 24:92  
*Pandaria divaricata* 22:186  
*Salsola cana* 22:190  
*S. kali* Ten.  
 var. *pachyphylla* 22:190
- S. pulla* 22:190  
*Schangania tribracteata* 22:188  
*Spinacia minor* 17:311  
*S. spinosa* Moench  
 var. *farinosa* 17:311  
*Suaeda longifolia* 22:188 (B)  
*S. maxima* 17:312  
*S. monantha* 17:313
- COMPOSITAE**  
*Achillea cuneata* 19:3  
*A. dshimilensis* 24:324  
*A. muschensis* 24:329  
*A. nobilis* L.  
 var. *marginata* 24:324  
*A. ossica* 24:323  
*A. wilhelmsii* 24:328  
*Adenostyles pontica* 23:696  
*Aethopappus pulcherrimus* Willd.  
 var. *denticulatus* 24:422  
*Amberboa odorata* DC.  
 var. *glauca* 17:39  
*Antennaria rubicunda* 17:49  
*Anthemis brachyglossa* 24:318  
*A. byzantina* 24:321 (GOET)  
*A. platyglossa* 24:319 (GOET)  
*A. ptarmicaeformis* 24:319  
*A. pterygantha* 17:44  
*A. tinctoria* L.  
 var. *macroglossa* 24:318  
 var. *microglossa* 24:318  
*Arachum pubescens* 23:681  
*Artemisia absinthium* L.  
 var. *monticola* 24:348  
*A. austriaca* Jacq.  
 var. *nivea* 17:46  
*A. monticola* 24:347  
*A. spicigera* 24:345  
*Aster amellus* L.  
 var. *armenus* 17:49  
*A. botryanthus* 23:701  
*A. hirtus* 23:701  
*Barkhausia elata* 23:684  
*B. hirta* 23:687  
*B. rhoeadifolia* Bieb.  
 var. *hispidissima* 23:685  
*B. triangularis* 23:686  
*Carduus candicans* W. & K.  
 var. *trichocephalus* 24:393  
*C. flavescent* 24:394  
*C. multijugus* 24:392  
*C. nervosus* 17:42  
 var. *humilis* 17:42  
*C. seminudus* Bieb.  
 var. *albanicus* 24:394  
*Centaurea albida* 24:433 (GOET)  
*C. albiflora* 24:430  
*C. appendicigera* 24:425 (GOET)  
*C. axillaris* Willd.  
 var. *albofimbriata* 24:426  
 var. *fusco-marginata* 24:426

- C. bicolor 24:428 (GOET) *var. ericin* 2  
 C. cyanifolia 24:436 *var. ciliolata* 2  
 C. depressa MB. *var. floccosa* 19:37  
 C. diffusa Lam. *var. oligocalathia* 24:434 (B)  
 C. montana L. *var. nigrofimbria* 24:426 (B)  
 C. ossica 17:40  
 C. pauciflora 24:433  
 C. recurvata 24:428 (G)  
 C. reflexa Lam. *var. laeviuscula* 24:429  
*var. macracantha* 24:429  
 C. salicifolia L. *var. abbreviata* 17:39  
*var. elongata* 17:39  
*var. intermedia* 17:39  
 C. squarrosa Willd. *var. aggregata* 24:434 (B)  
*var. colensis* 24:434  
 C. thirkei 19:37 (MO)  
*Centaurium leptophyllum* 24:419 (GOET)  
 C. odorata *var. bipinnatifida* 24:417  
 C. rhizocalathium 24:417 (GOET)  
 C. saxatile 24:419  
*Chamomilla unilateralis* 24:338  
*Chardinia macrocarpa* 24:382  
*Chartolepis saligna* 24:421  
*Chondrilla glomerata* 23:673  
*Cirsium duriusculum* 24:410  
 C. erythrolepis 17:41  
*C. hypoleucum* DC. *var. lazicum* 24:409  
 C. oblongifolium 17:41 (GOET)  
 C. penicillatum 17:41  
*C. uliginosum* Bieb. *var. glaberrimum* 24:408  
*Cousinia bulgarica* 24:385  
 C. gundelia 24:387  
 C. heterolepis 24:386  
 C. squarrosa 24:387  
*Crepis ciliata* 17:277  
 (†B, P: photos. MO)  
 C. dens-leonis 23:689  
 (†B: photo. MO)  
 C. multicaulis 23:690  
 C. olympica 23:691  
 C. youngiformis 17:277  
*Doronicum vaginatum* 24:356  
*Echinais sclerantha* Bieb.  
*var. macrocephala* 24:404  
*Echinops connatus* 24:380 (B)  
 E. ossicu 24:380  
 E. rochelianus Griseb.  
*var. cirsifolius* 24:379  
*Epitrachys longifolia* 24:401  
 E. macrobotrys 24:399 (GOET)  
 E. microcephala 24:402  
 E. szovitsii 24:397  
 E. tenuiloba 24:400 (GOET) *var. ciliolata* 2  
*Gnaphalium alpinum* 24:354 (GOET)  
*var. emaculatum* 24:354  
*Gymnocline argyrophylla* 24:340  
*Helichrysum commixtum* 24:351  
*H. lavandulaeolum* Willd.  
*var. congestum* 24:352  
*var. majus* 24:352  
*var. rubicundum* 24:352  
 H. pluriceps 24:348  
 H. tschabanicum 24:349 (GOET)  
*Hemipappus canus* 24:341 (GOET)  
 H. isabellinus 24:341  
*Hieracium longipes* 23:680  
*H. umbellatum* L.  
*var. ramosum* 17:278  
*var. simplex* 17:278  
*Hypochoeris radicata* L.  
*var. lasiophylla* 23:655  
*Inula germanica* L.  
*var. simplex* 23:709  
*Jurinea alpigena* 24:414 (B, GOET)  
 J. macracalathia 24:415  
 J. mollis L.  
*var. integricepsula* 24:413  
 J. pluriceps 24:413  
 J. roegneri 24:414  
*Lactuca caucasica* 17:275  
*var. major* 17:276  
*var. minor* 17:276  
 L. cyanea 23:671  
 L. tephrocarpa 23:672 (GOET)  
*Lampsana communis* L.  
*var. anguloso-dentata* 17:274  
*var. denticulata* 17:274  
 L. intermedia Bieb.  
*var. angustata* 23:652  
*var. cordata* 23:653 (B)  
*var. ovata* 23:652  
*Lappa glabra* Lam.  
*var. caucasica* 17:43  
*Leontodon proteiforme* Vill.  
*var. leianthus* 23:656  
*Lepicaule dshimilensis* 23:683  
*Matricaria grandiflora* 24:336  
 M. heterocarpa 24:333  
 M. microcephala 24:336  
 M. praecox (Bieb.) DC.  
*var. alpigena* 24:335  
*Microlonchus cichoraceus* 24:416  
*Mulgedium dshimilense* 23:669  
 M. dubium 23:670  
 M. glabrum 23:668  
 M. grande 17:279  
*var. glabrum* 17:279  
*var. tachorum* 23:668  
 M. petiolatum 17:279  
 M. salicifolium 23:669  
*Onopordon acanthifolium* 24:690  
*Phaeopappus ossicus* 24:436  
*Picris glomerata* 23:666

- P. hieracoides* L.  
var. *integrifolia* 23:665
- Podospermum alpinum* 23:658
- P. buxbaumii* 17:274
- P. heterophyllum* 17:275
- P. meyeri* 23:659
- Pterotheca nemauensis* Cass.  
var. *glaucescens* 17:277  
var. *hirta* 17:277
- Pulicaria congesta* 23:711
- P. uliginosa* Stev.  
var. *canescens* 23:711
- Pyrethrum armenum* 17:46
- P. jacobaeaeformis* 24:331  
var. *congestum* 24:331
- Scorzonera suberosa* 17:275 (GOET)
- Senecio amphibolus* 24:361
- S. cyri* 24:362
- S. gundelius* 24:364
- S. jacobaea* L.  
var. *lanuginosus* 24:366
- S. mollis* Willd.  
var. *dshorochensis* 24:365  
var. *euphratensis* 24:365
- S. nemorensis* L.  
var. *alpinum* 24:360  
var. *pilosus* 17:48
- S. pandurifolius* 17:48
- S. rariflorus* 17:47
- S. saracenicus* L.  
var. *sclerophyllus* 24:359
- S. taraxacifolius* Bieb.  
var. *ponticus* 24:364
- S. thrysophorus* 24:362
- S. tschabanicus* 24:370
- S. vernalis* W. & K.  
var. *elatus* 24:368
- Serratula quinquefolia* Bieb.  
var. *macrocephala* 24:412  
var. *microcephala* 24:412
- Solidago virgaurea* L.  
var. *brevipappus* 23:706  
var. *maxima* 17:50
- Taraxacum integrifolium* 23:676
- T. officinale* Wigg.  
var. *eriocalyx* 17:276
- Telekia ovata* 23:712
- Tolpis quinqueradiata* 23:654 (B)
- Tragopogon brevifolius* 23:662
- T. dshimilensis* 23:663 (B)
- T. tuberosus* 23:662 (B)
- Xeranthemum radiatum* Lam.  
var. *macranthum* 17:38 (GOET)  
var. *micranthum* 17:38  
var. *sativum* 17:38
- CONVOLVULACEAE**
- Convolvulus agrophilus* 22:745
- C. amoenus* 19:19 (LE, MO)
- C. cantabrica* L.  
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